LAND AND CHEMICALS DIVISION
QUALITY ASSURANCE PROJECT PLAN
For Field Sampling Events

Veolia ES Technical Solutions, L.L.C.
7 Mobile Avenue
Sauget, Illinois 62201
ILD 098 642 424

8/23/2013

A1. Approvals

PREPARED BY:
Todd Ramaly
Land and Chemicals Division, U.S. EPA, Region 5

APPROVED BY: **Jamie Paulin**

Assigned QA Contact
Land and Chemicals Division, U.S. EPA Region 5

APPROVED BY: **Mary Setnicar**
Section Chief Responsible for Sampling Event
Land and Chemicals Division, U.S. EPA Region 5

APPROVED BY: **Gary Victorine**
Branch Chief Responsible for Sampling Event
Land and Chemicals Division, U.S. EPA, Region 5

Prologue
A QAPP is designed to focus primarily on :
1) the Data Quality Objectives for the event, (the end result of what the data will be used for),
2) the boundaries of the sampling event (the population that the samples taken herein represent)
3) the acceptance or rejection of the problem posed in the event (the hypothesis)
The QAPP also outlines the analytical methods and QA/QC procedures that are used to analyze the samples and manage the data. The QAPP should include the organization and responsibilities of project laboratory and data assessment personnel; QA objectives; sample receipt, handling, custody, and holding time requirements; analytical procedures, equipment preventive maintenance, calibration, internal quality control procedures, and performance/system audits; data reduction, review, and reporting; and data assessment, data usability, and DQO reconciliation. Additional information may be obtained from EPA QA/R-5, EPA QA/G-5, and other references. **RED FONT AREAS ARE TO BE FILLED IN DURING QAPP DEVELOPMENT**

A2. TABLE OF CONTENTS

LIST OF ACRONYMS	
CERCLA	**Comprehensive Environmental Response, Compensation, and Liability Act**
CRL	**Central Regional Laboratory, U.S. EPA Region 5**
DQO	**Data Quality Objective**
FSP	**Field Sampling Plan**
QA	**Quality Assurance**
QAPP	**Quality Assurance Project Plan**

QMP	
QC	**quality control**
RCRA	**Resource Conservation and Recovery Act**
RPD	**relative percent difference**
SA	**amount of spike or surrogate added**
SAP	**Sampling and Analysis Plan**
SOP	**Standard Operating Procedure**
SSR	**spiked or surrogate sample result**
SR	**unspiked sample result**
U.S. EPA	**U.S. Environmental Protection Agency**

LIST OF TABLES

LIST OF APPENDICES	
SAMPLING AND ANALYSIS PLAN……	**APPENDIX A**
CRL METHODS USED	**APPENDIX B**
SUBCONTRACT LAB METHODS USED (If necessary)	**APPENDIX C**

A3. DISTRIBUTION LIST

The management, quality assurance, laboratory and field responsibilities are as follows for the United States Environmental Protection Agency (U.S. EPA) sampling event:

U.S. EPA LCD Project Manager – **Todd Ramaly and Chris Lambesis**
U.S. EPA LCD QA Contact and LCD/CRL Coordinator/REPA COR – **Jamie Paulin**
U.S. EPA CRL QA Coordinator – (Currently) **Amanda Wroble**

A4. PROJECT/TASK ORGANIZATION

A4.1 EPA Project Management

A4.1.1 EPA Project Manager

The EPA Project Managers are Todd Ramaly and Chris Lambesis and are responsible for all project activities, and will coordinate field activities.

A4.1.2 EPA Project Assistant

There **is no** EPA Project Assistant **assigned.**

A4.2 Quality Assurance Responsibilities

A4.2.1 EPA Quality Assurance Coordinator

The EPA Quality Assurance Contact is **Jamie Paulin**, and is responsible for review of the QAPP.

A4.2.2 EPA CRL Analytical and QA Responsibilities

The ***Central Regional Laboratory (CRL)*** will be responsible for conducting analyses, ensuring that the CRL quality assurance program is implemented, and preparing a report of CRL analyses and quality assurance for the Project Manager. The CRL QA coordinator will ensure that the appropriate standard operating procedures (SOPs) are followed, and that a complete data package is delivered to the EPA Project Manager in the agreed turn around time with CRL.

A4.2.3 U.S. EPA Project Manager Responsibilities

The **U.S. EPA Project Manager** is ultimately responsible for all activities at the site, and coordinating with CRL to complete all proper analyses.

In addition, he or she is responsible for the following:

- preparation of the sampling plan based on site knowledge

- performing and oversight of sample collection activities
- ensuring that the sampling plan and QAPP are followed by the field team

A4.2.4 U.S. EPA Field Team Responsibilities

The **U.S. EPA Field Team** is responsible for the following:

- sample collection
- photo documentation of the sampling event
- completely recording the details of the sampling event in a log book
- ensuring the QAPP and sampling/safety plans are implemented
- delivering the environmental samples from the field to CRL
- preparing a report of field activities and field quality assurance
- ensuring that chain-of-custody procedures are followed from time of sample collection to arrival of the sample at the laboratory

A4.3 Laboratory Responsibilities (EPA CRL)

CRL is responsible for analysis **(USING ANALYTICAL METHODS FILLED IN HERE)** to determine the concentration of **total mercury** in the sample. The sample will be analyzed for mercury content.

A complete data package for each analysis shall be composed, and adherence to all CRL analytical methods and procedures shall be required.

A4.4 Field Responsibilities

The U.S. EPA Field Team will be responsible for the sample collection and preparation of the samples, initiating and maintaining chain-of-custody, and delivering all samples to CRL.

A5. PROBLEM DEFINITION/BACKGROUND

A5.1 Site History

Region 5 EPA LCD was asked by Region 5 EPA ARD to assist in reviewing a compliance test burn plan for the Veolia facility in support of the CAA MACT for hazardous waste combustors. As part of this review, ARD asked if LCD could provide oversight during mercury spike preparation and later during waste sampling as part of the test burn.

A5.2 Sampling Area

The facility laboratory will be used to prepare the spike solution and collect the split sample.

A5.3 Project Purpose

Analysis of a sample of the spike solution will confirm whether or not the spike solution preparation procedure included gross mistakes such that the concentration determined by mass balance is inaccurate.

A6. PROJECT/TASK DESCRIPTION

A6.1 Existing Information

The matrix is mercury(II) nitrate hydrate dissolved in nitric acid and d.i. water. Similar prepared spike solutions in the past at this facility have contained total mercury between 500 and 10,000 mg/L concentrations.

A6.2 Task to be Performed

Observe spike preparation procedures and documentation and obtain, from the facility, a split sample of the spike solution. This solution is then to be analyzed by CRL for total mercury.

A7. QUALITY OBJECTIVES AND CRITERIA

Project Data Quality Objectives (DQOs) provide criteria against which project performance can be evaluated to determine whether overall project QA objectives are met.

Problem definition. **Has the mercury spike solution been properly prepared and will mass balance calculations based on good laboratory technique be reasonably accurate?**

Decision to be made. **Does the analytical result of the split sample reasonably approximate the expected concentration in the spike solution such that gross errors in spike preparation can be ruled out?**

Inputs to the Decision. Inputs include the following: **(FILL IN DECISION INPUTS)**

- Analytical data from the samples collected during the inspection.
- **The expected concentration of total mercury in the spike solution calculated from a mass balance of spike preparation procedures.**
- Analytical method reporting limits.

Study Boundaries.

Decision Rule. **(FILL IN)**

If the split sample concentration is within 25% of the expected concentration of total mercury in the spike solution calculated from a mass balance of spike preparation procedures, we will consider the spike solution calculated from mass balance to be confirmed.

Limits on Decision Errors. The decision rules will be applied using valid data derived from the samples. Samples will be selected to be representative of existing conditions. Data quality requirements specific to the method for precision and accuracy will be used to determine the validity or usability of the data. The method precision and accuracy requirements are defined in the individual laboratory procedures and the laboratory QAPP.

Optimize the Design. The locations of possible sources, technical characteristics of the contaminants, and the media in which they are present have been used to determine a cost-effective design for the sample collection. This study will be performed to minimize the number and type of samples collected while supplying sufficient data upon which to apply the decision rules.

A7.1 Project Schedule/Time Table

The time table for this project is as follows:

Table 1. Estimated Project Schedule

Activity	Date
QAPP/Sampling and Safety Plan Approved	DATE: **8/26/2013**
Field Sampling	DATE: **8/27/2013**
Sample Analysis	**On or before 9/16/2013, if possible.**
Data Verification	**On or before 9/16/2013, if possible.**
Draft Report	**On or before 9/16/2013, if possible.**
Final Report	Within **45 days** of draft report.

A8. SPECIAL TRAINING/CERTIFICATION

The U.S. EPA Sampling Team members and the CRL analytical staff possess the required training and qualifications to perform their functions for this project. No special training is anticipated for this project.

A9. DOCUMENTS AND RECORDS

The Quality Management Plan (QMP), Land and Chemicals Division, Region 5, May 2008, was used for preparation of this QAPP. Other documents that will be produced as a result of this project include a field notebook, an analytical report generated by CRL, and a Final Report generated by the Project Manager.

GROUP B. DATA GENERATION AND ACQUISITION ELEMENTS

B1. SAMPLING PROCESS DESIGN (EXPERIMENTAL DESIGN)

Complete sampling procedures may be found in the companion sampling plan. *See the site-specific SAP for this project (Appendix A).*

B2. SAMPLING METHODS

See the SAP for this project. Appendix A.

B3. SAMPLE HANDLING AND CUSTODY

B3.1 Field Custody Procedures

The environmental samples will be maintained under custody at all times from collection until delivery to CRL. The CRL will maintain the samples under custody through analyses. The custody procedures to be followed mimic the EPA Samplers Guide to the CLP program EPA/540/R-96/032). CRL is the evidence file custodian. Complete field custody procedures to be used are also found in the SAP for this project.

B3.2 Laboratory Custody Procedures

CRL custody procedures for sample receiving and log-in, sample storage and numbering, tracking during sample preparation and analysis, and storage of data are described in the CRL QMP.

B3.3 Final Evidence File Procedures

All hard copy analytical data and chain-of-custody records shall be retained by the CRL following the analyses, with one copy provided to the Project Manager. The CRL shall review the data and provide a verification report. The hard copy analytical data, custody records and

verification report shall be maintained in the CRL's secure, limited-access data storage area. This portion of the evidence file shall be stored at the CRL for a period of three years after which the records shall be offered to the Project Manager prior to permanent transfer to the Federal Records Center in Chicago. Each laboratory shall maintain all raw analytical data on magnetic media whenever possible for a period specified in their laboratory QAPP.

The Project Manager or his designee shall maintain the portion of the final evidence file including: field logbooks, photographs, drawings, field QA/QC reports, data assessment report, and final project report.

B4. ANALYTICAL METHODS

B4.1 Field Analytical and Measurement Procedures

None.

B4.2 Laboratory Analytical and Measurement Procedures

CRL Standard Operating Procedures (SOPs) will be used for all analytical procedures on this project. Appendix B and C contain all the analytical methods used in this project.
(change this area if another laboratory is used, and include SOPs/methods in the appendices)

The methods included are: **(FILL IN)**
Examples

- *Toxicity Characteristics Leaching Procedure: SW-846 1311 (CRL modified SOP).*
- *Inductively Coupled Plasma - Atomic Emission Spectrometry: SW-846 6010B (CRL modified SOP).*

B5. QUALITY CONTROL

B5.1 Field Quality Control Checks

The primary quality control (QC) checks will be the collection of a sufficient amount of sample to assure adherence to the SAP. The sampling procedures consist only of collecting whole, intact lamps, and placing them in containers for safe transport to the laboratory. No special equipment will be used that could contaminate the lamps.

B5.2 Laboratory Quality Control Checks

These QC checks will primarily include initial and continuing calibrations, QC check samples, method blanks, and laboratory duplicates.

The QC limits are given in each method or procedure.

B5.3 Quality Assurance Objectives

B5.3.1 PRECISION

Precision is the degree to which data generated from replicate or repetitive measurements differ. Precision may be stated in terms of standard deviation, range, relative percent difference and relative range.

B5.3.1.1 Field Precision

None.

B5.3.1.2 Laboratory Precision (Change, if Required)

Laboratory precision is determined using laboratory analytical duplicates. Precision is measured by the relative percentage difference in concentration between two samples. The precision objective for this event is for duplicates to match within 20% relative difference.

B5.3.2 ACCURACY

Accuracy is defined as the difference between a reported value and a known or accepted value.

B5.3.2.1 Field Accuracy (CHANGE, if REQUIRED)

No equipment (rinsate) blanks will be required.

B5.3.2.2 Laboratory Accuracy

Laboratory accuracy may be assessed through the use of spiked samples, check standards, and initial/continuing calibrations. If a matrix spike and matrix spike duplicate cannot be prepared to determine accuracy then the laboratory must use a laboratory blank and provide an explanation.

B5.3.3 COMPLETENESS

Completeness is defined as the measure of the percentage of the amount valid, acceptable data generated, relative to the amount of data that was expected to be collected. For this project, completeness objective is 100%.

B5.3.4 REPRESENTATIVENESS

B5.3.5 COMPARABILITY

All data collected during this project is intended to be comparable for all sampling locations by consistently using step wise sampling and analytical procedures.

B6. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

B6.1 Field Instrument and Preventative Maintenance

No field instruments will be used.

B6.2 Laboratory Instrument and Preventative Maintenance

The Laboratory shall follow standard, established procedures. Any deviation should be cleared through the EPA quality assurance coordinator prior to analysis.

B7. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

B7.1 Field Instrument Calibration (FILL IN IF REQUIRED)

Not applicable for this project.

B7.2 Laboratory Instrument Calibration

Calibration procedures for laboratory instruments will consist of initial calibration, calibration verification and continuing calibration verification. For a description of the calibration procedures for a specific laboratory instrument, refer to the procedures and methods provided by CRL for running the required analyses.

CRL will maintain a sample logbook for each instrument which will contain at least, but not limited to the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions run and the samples associated with these calibrations.

B8. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

B9. NON-DIRECT MEASUREMENTS

Not applicable.

B10. DATA MANAGEMENT

No separate quality assurance reports to management are expected for this project. The final project report shall include a quality assurance section that shall summarize the verification of field and laboratory data, any field or lab QA problems, field and lab audit results and proposed and/or implemented field corrective actions.

The CRL QA coordinator will ensure that a complete data package is delivered to the EPA Project Manager for verification in the agreed turn around time for CRL.

See Group B, Section B3, B3.3, Final Evidence File Procedures for data management procedures.

GROUP C. ASSESSMENT AND OVERSIGHT ELEMENTS

C1. ASSESSMENTS AND RESPONSE ACTIONS

The Project QA Coordinator has the responsibility for conducting Performance and System Audits, as needed.

C1.1 Field Performance and Systems Audits

U.S. EPA Field Audits will not be required for this project, since U.S. EPA staff will be conducting the field sampling.

C1.2 Laboratory Performance and Systems Audits

No project-specific laboratory audits by the U.S. EPA of the CRL are expected prior to the initiation of sampling. CRL has undergone several quality systems audits prior to this project. **(If audit or Performance Evaluation Testing of another lab is required, fill in)**

C1.3 Assessing Data Precision, Accuracy and Completeness

C1.3.1 PRECISION ASSESSMENT

Precision shall be assessed using relative percent difference (RPD) calculated as:

$$RPD = \frac{D1 - D2}{(D1 + D2)/2} \times 100\%$$

where, D1= investigative sample result
D2= duplicate sample result

C1.3.2 ACCURACY ASSESSMENT

Accuracy may be assessed using % recovery of spiked or surrogate standard sample results calculated as:

$$\% \text{ Recovery} = \frac{(SSR - SR)}{SA} \times 100\%$$

where, SSR = Spiked or surrogate sample result
SR = Unspiked sample result
SA = Amount of spike or surrogate added

C1.3.3 COMPLETENESS ASSESSMENT

Completeness is defined as the percentage of the amount of valid data obtained relative to the amount of data which was expected to be collected.

$$\text{Completeness} = \frac{\text{Amount of valid data obtained}}{\text{Amount of data expected to be collected.}} \times 100\%$$

C1.4 CORRECTIVE ACTION

The need for corrective action during the project may be determined at several points: during field activities, during lab activities and during data validation & assessment. All corrective action procedures will be reviewed with the assigned EPA QA Contact and documented in the final report.

C1.4.1 Field Corrective Action

Corrective action in the field may be necessary due to quality assurance problems during sampling that were not anticipated in this QAPP. In general, the need for corrective action will be identified by the field team leader. Corrective action should be approved by the assigned EPA QA Contact prior to initiation. The field team leader may consult other technical staff (i.e. CRL, risk assessors, senior geologists, etc.) regarding potential corrective actions where data quality is an issue.

C2. Reports to Management

The final project report shall include a QA section that shall summarize the verification of field and laboratory data, any field or laboratory QA problems, field and laboratory audit results and proposed and/or implemented field corrective actions. The report will also discuss the field activities and analytical results. Details on the reporting requirements for this project can be found in the SAP (Appendix A).

GROUP D. DATA VALIDATION AND USABILITY ELEMENTS

D1. DATA REVIEW, VERIFICATION, AND VALIDATION

The EPA Project Manager will record all qualitative descriptions, diagrams of the sample area, sample locations, and the name of the EPA Field Team Member collecting each sample in a log book. A photo log of the sampling event will also be produced.

D2. VERIFICATION AND VALIDATION METHODS

D2.1 Laboratory Data Reduction (FILL IN OR CHANGE)

CRL data reduction procedures for the analyses are specified in each section of the CRL's SOPs.

D2.2 Laboratory Data Verification (FILL IN OR CHANGE)

CRL data verification procedures for the analyses are specified in each section of the CRL's SOPs.

D2.3 Laboratory Data Validation

The Project manager will rely on the information contained in the data package and laboratory report, as provided by the CRL, for validation of the data generated in this project.

D2.4 Laboratory Data Reporting

The CRL shall follow standard, established procedures. Any deviation from the procedures should be cleared through the U.S. EPA QA contact before execution.

D3. RECONCILIATION WITH USER REQUIREMENTS

D3.1 Laboratory Corrective Action

All laboratories will follow standard, established procedures. Any deviation from standard procedures should be cleared through the U.S. EPA QA contact before execution.

D3.2 Corrective Action During Data Verification and Data Assessment

The need for corrective action may be identified during the data verification process conducted by the CRL. If the corrective action requires re-analyzing the sample, the laboratory QA coordinators in conjunction with analysts shall determine whether the samples are within holding time and whether sufficient sample remains for re-analysis.

If data are determined to be unusable, results are estimated quantitatively or the samples cannot be re-analyzed, the EPA QA Contact and the field team leader will be advised of the situation by the CRL. The U.S. EPA Project Manager can then determine the feasibility of re-sampling or accepting the limitations of the data.